# Chapter 5
# Roles in Business Intelligence

Whether you are building a BI team and would like to know which are the most important BI roles, a student who would like to understand the main roles in BI, or a BI job aspirant deliberating which role to consider, this chapter will provide you enough details to understand the main roles in BI and help you in your endeavor. This chapter could be more interesting for students than those who have already worked in BI to learn about various BI roles. It could also be interesting for managers or the top management, for people who are going to manage or build BI teams in the future.

In this chapter we will first look at a simple and typical BI team structure, and then cover different BI organizational models. We will then learn about different BI roles and their responsibilities after which the confusion around a few roles such as BI analyst and BI business analyst are clarified. For those who are already in BI, this could be a good refresher of the roles and responsibilities, and provide you a framework to understand where your organization stands in terms of BI organizational models and BI roles.

## Structure

We will cover the following topics in this chapter:

- Setting the context

- Typical BI team structure
  - BI organizational models
    - ❖ NGDE
    - ❖ SGDE
    - ❖ CGCE
    - ❖ CGDE
- BI roles and responsibilities
  - Technical roles in BI
    - ❖ Business Intelligence Administrator
    - ❖ Business Intelligence Architect
    - ❖ Business Intelligence Developer
    - ❖ Business Intelligence Tester
  - Techno-functional roles in BI
    - ❖ Business Intelligence Analyst
    - ❖ Business Intelligence Business Analyst
    - ❖ BI Analyst vs BI Business Analyst
  - Management roles in BI
    - ❖ C-Level Role
    - ❖ Head of Business Intelligence
    - ❖ Business Intelligence Team Lead
  - Exclusions

# Objectives

Getting to know a typical BI team structure and understanding the characteristics of different BI organizational models. Learning about various BI roles, different job titles for the same roles, and responsibilities in each category in a BI team. Understanding the difference between a BI analyst and BI business analyst, and between a data analyst and a BI analyst.

# Setting the context

In an organization, BI roles similar to other roles can be staffed by hiring and building internal teams, contracting freelancers, or by partnering with a service provider. In this chapter, we will discuss about roles from the context of an internal team, that is, we are not considering BI roles from IT service provider companies.

By BI roles, we are referring to the team members that implement, maintain, and operate a BI solution and analyse data, for example, a BI analyst whose core job is to deal with the process of deriving information and insight from data. We are not discussing about general BI users such as sales manager, marketing manager, HR manager, Walget's store manager or regional manager, etc., whose core responsibility is something else but use BI as part of their job. Technical roles such as **database administrator** (**DBA**), network engineer, or server administrator are also not covered as these roles are not BI specific roles.

# Typical BI team structure

As every organization is different, every BI team is also structured differently. Even within the same organization, BI teams can be structured differently. We will begin by looking at a typical BI team structure in a **small to medium enterprise** (**SME**). In large companies, there can be multiple teams of this type and size. *Figure 5.1* depicts a typical BI team structure in an SME.

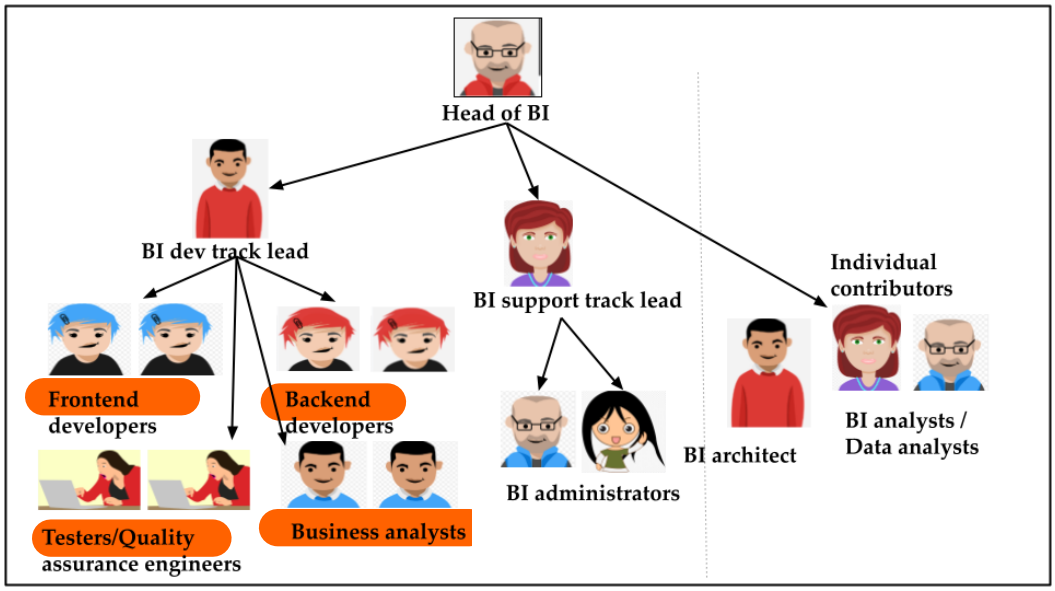


***Figure 5.1**: Typical BI team structure*

In a typical BI team structure there is a development track that consists of business analysts, frontend developers, backend developers, and testers/quality assurance engineers, a support track that mainly consists of administrators, and a few individual contributors. The leads of development track and support track and the individual contributors report to the Head of BI. It is important to note that a single person may carry out more than one role and two or more people may carry out a single role. All possible combinations that you can imagine can be found in one or the other

companies. The BI team structure provided in *Figure 5.1* is reflective of what we currently see in companies. Multiple such BI teams can operate in a large company. What happens when there are multiple such BI teams within an organization? How are the teams organized? How are the works/projects distributed between teams? To find answers to such questions, let's go through the BI organizational models.

# BI organizational models

Large organizations may have hundreds, in some cases more than thousands of employees working in a BI department. For example, in 2014, Target (an American retail corporation) had around 1600 team members in their BI and analytics department.[32] When there are multiple BI teams within an organization, the BI organization structure can be broadly grouped into one of the four BI organizational models as explained in the following paragraphs. The four organizational models of BI are listed below in the increasing order of maturity and efficiency.

- **No governance and decentralized execution (NGDE)**
- **Some governance and decentralized execution (SGDE)**
- **Centralized governance and centralized execution (CGCE)**
- **Centralized governance and decentralized execution (CGDE)**

Note that the abbreviations NGDE, SGDE, CGCE, and CGDE are not commonly used abbreviations but have only been introduced in this book for convenience and better understanding. These models are reflective of what currently exists and not to be considered as prescriptive.

If we refer to a model as only centralized, it is not clear if the execution is also centralized or if only the governance aspect of the model is centralized. Therefore, the models are based on the approach followed for governance of BI and the approach followed for execution. Execution refers to all the activities in the implementation and live phase as we saw in *Chapter 4: Challenges in Business Intelligence*. BI governance activities include:

- Prioritizing BI projects, programs, and initiatives and ensuring effective usage of BI.
- Driving BI adoption across the organization.
- Selecting BI tools and technologies as well as managing BI vendors for the entire organization.
- Organizing BI training for both BI team members and users.
- Enabling collaboration among BI teams by establishing platforms and channels.

- Establishing standards for BI development (coding, documentation, number of minimum environments, etc.), testing, hiring, etc.
- Developing frameworks (e.g. metadata logging) and templates (e.g. deployment checklist, project onboarding checklist, requirements specification template, etc.).
- Guiding and ensuring that BI teams across the organization follow the standards, make use of the frameworks and templates, adhere to the policies and share best practices through documentation, meetups, newsletters, announcements on portal, etc.

**Note**: In some organizations, the support and maintenance function are also carried out by a centralized team whereas the development activities are carried out by decentralized teams. However, support and maintenance activities are not be considered as BI governance activities.

Governance activities can be carried out by a team of its own (dedicated team for governance activities only) or by a virtual team or an official group with a few members from various BI teams across the organization. The governance function can be taken up by the **Business Intelligence Competency Center** (**BICC**), **Center of Excellence and Center of Expertise** (BI **COE**), Analytics COE, Data and Analytics COE, or the enterprise BI teams.

Now let's take a look at the characteristics of each of the four BI organizational models.

## NGDE

The NGDE model can also be called as the fully-siloed model or simply as the chaos model. The characteristics of the NGDE model are as follows:

- In this model every BI team is autonomous. Every team has its own set of tools, technologies, processes, standards, priorities, even their own job specifications which are different from the other BI team's job specifications for the same role. If there is anything common between any two teams, it's usually a coincidence and unplanned.
- The teams in this model belong to different departments and report to different top-level leaders (C-level). For example, some BI teams may operate under the CFO whereas some under the COO, CMO, etc.
- Teams fulfil only the requirements of the department they are in.
- There is no collaboration between the BI teams. Please note that within a BI team there could be good teamwork and collaboration, however, there is no sharing of best practices and learning across different teams.

- This BI organizational model is a result of lack of centralized BI leadership. From a high-level (corporate-level) view it can be noticed that there is chaos, but the BI teams themselves may not realize it as they do not have an overview of all the different BI projects and initiatives that are happening simultaneously.
- High cost of operations due to poor or inefficient management leading to situations such as purchase of redundant hardware and software as well as under/inefficient utilization of each teams' capabilities.
- Mismatch in BI budget allocation. The teams that are supposed to be working on the most critical and important initiatives may not be the ones that get the required budget allocation.

## SGDE

The SGDE model can also be called as the mostly decentralized model. The characteristics of SGDE model are as follows:

- Similar to NGDE, every BI team is autonomous. Every team has their own set of tools, infrastructure, technologies, processes, standards, priorities, and even job specifications that are different from the other BI teams' job specifications for the same role. However, unlike NGDE, if there is anything common between any two teams, that's mostly because one team has adopted the practices from the other as some channels are established for collaboration between the teams.
- Similar to NGDE, teams belong to different departments and report to different top-level leaders.
- Teams fulfil only the requirements of the department they are in.
- There is some governance through informal channels (that is, there is no budget, no dedicated head count, no authority to enforce) created usually by proactive members from different teams. There is some collaboration between teams, some channels are open for collaboration by the teams themselves, for example, they share best practices and learnings between teams during meetups/knowledge sharing sessions but there is no authority to ensure that the best practices learnt from other teams are actually applied.
- This BI organizational structure is also not planned and could be a result of inorganic growth. It may happen that during restructuring of the overall organization, BI teams may not receive the priority they deserve. Companies, when they acquire or merge, usually prioritize integration of core applications and systems before BI applications can be consolidated. If a company is often acquiring new businesses, there may be no time to focus

on consolidating BI applications. BI teams and leadership both realize that there is chaos from the higher-level view but are in no position to make big changes. This often leads to teams trying their best to collaborate with other teams using available channels.

- Again, cost of operations is high due to poor or inefficient management.
- Mismatch in BI budget allocation continues in this model as well. Teams working on the most critical and important initiatives may not receive sufficient budget allocation. Though due to collaboration, the teams may at least be aware of the budget allocated to another team unlike NGDE.

## CGCE

The CGCE model can also be called as fully centralized or unitary model. The characteristics of the CGCE model are as follows:

- Compared to NGDE and SGDE, the CGCE model is a polar opposite. All BI members are part of a large BI team and use the same set of tools, technologies, processes, standards, etc. Temporary sub-teams are created by allocating some of the BI team members for the project duration. Once the projects are completed, the sub-team members are reallocated to another project but they always remain part of the larger BI team. All BI team members report to the same top-level leader.
- Team members are centrally hired, managed, and there are standard job profiles and defined career paths.
- BI projects are centrally prioritized and only then assigned to the sub-teams.
- Teams fulfil requirements of any of the departments across the organization.
- Full collaboration exists across the entire BI team through officially established channels. Sharing of best practices and learnings are actively promoted.
- This BI organizational model is fully planned and is a result of good leadership and consolidation of BI teams.
- Low overall cost of operations due to savings from broader use and reuse of tools and technology across the organization and efficient utilization of team capabilities.
- There is an overall budget for the entire BI department which is allocated/used for different projects based on its importance. Therefore, the projects that are most critical and important get the right budget allocation.
- While in theory this model seems to be ideal, in practice, onboarding the requirements, executing them and governing at the same time can become

a big challenge as all the requirements are routed centrally. The number of requirements can overwhelm the BI department, execution can take up more time and thereby result in less time for effective governance.

- Whenever some business situations or requirements mandate changes in BI priorities, many projects are impacted as all the projects are centrally executed and are dependent with respect to resources. Impact analysis can take a lot more time compared to decentralized execution models.
- Some business units may start to feel that they are being neglected and that they don't get any priority or the attention they deserve.

## CGDE

The CGDE model can also be called as partially centralized or federal model. The characteristics of the CGDE model are as follows:

- Similar to CGCE, every BI team uses the same set of tools, technologies, processes, job profiles, etc.
- Standards are established by the centralized BI governance function/group. However, the execution is decentralized. Teams are specific to business units or locations and report to different top-level leaders.
- Once the teams are assigned a focus area (focus area could either be subject area such as marketing, HR, sales, etc., or source applications such as ERP, CRM, etc.), only the projects related to those focus areas are prioritized at that corresponding team level.
- Teams mainly fulfil only the requirements of the departments they are in but pitch in to support other teams when the need arises. As tools, processes, and other resources are shared across teams, they are able to move freely and contribute quickly without a long ramp up time.
- Similar to CGCE, collaboration exists across the larger BI team through officially established channels. Sharing of best practices and learning are promoted actively.
- This BI organizational structure is also fully planned and a result of good leadership and consolidation of BI teams.
- Low overall cost of operations due to savings from broader use and reuse of tools and technology across the organization and efficient utilization of team capabilities as team members can be moved across teams.
- Budget is usually team specific at a business unit level.
- Governance activities are separated from BI execution. This model has its advantage that members of the governance team are not involved in the day-

to-day execution activities and therefore have capacity to actively take part in governance activities.

It is to be noted that no BI organization structure is permanent. Every company continues to make changes to its BI team structure based on changing business needs. The BI organizational model could be different at different points in time. For example, when an organization becomes a global company from a local start-up by acquiring companies in different parts of the world, initially the BI organization model could be NGDE and then gradually as the company matures in its processes and operations it may move to SGDE, CGCE or CGDE model. Another point which is a unique aspect of a BI department is that it is not clear and there are no written rules that exist that govern where a BI department/function should sit within an organization. All varieties can be seen. In some organizations, BI is fully under the marketing department, in some organizations it's under IT, in others under Finance, or as a separate enterprise department reporting directly to C-level, etc. Various arrangements are being tried out.

Note that the roles and responsibilities associated with the roles that we will now explore in the next sections are true for all BI organizational models.

# BI roles and responsibilities

BI roles can be grouped into three categories: technical, techno-functional, and management roles. We will not discuss generic roles that fall under these groups but only the BI specific roles. Note that every BI role is important, every role adds value, every role has its own sets of challenges, there is no such thing as one role is better or worse than the other. A team member who has carried out only one role may wrongly assume that their role is the most difficult or a thankless job, however, if given the chance to experience another role, a team member might learn the challenges that exists for other roles. The reason I am emphasizing this point is because I have seen too many questions on this topic in various forums where there is a presumption that one BI role is somehow less or more challenging than the other. The roles are introduced in an alphabetical order or in the order of hierarchy when it comes to management roles.

These roles should also be considered as representative of other equivalent job titles mentioned under every role. The responsibilities stated here should not be considered as comprehensive or a mandatory set of responsibilities for the role. Not all responsibilities are always part of the role. There can be overlaps, a role may or may not exist, there can be different arrangements depending on the organization structure and team structure. Depending on the size of the organization, a role could be an additional responsibility, a shared role, or one person or a team in itself. The intent is to provide a generally-true set of responsibilities under each role.

# Technical roles in BI

Team members in technical roles are the ones who actually create the technical architecture, technical designs, develop (code, program, create), test, support, and maintain the BI solution.

## Business Intelligence Administrator

Other equivalent job titles to BI administrator role are as follows:

- BI Production Support Engineer
- BI Support Engineer
- BI Application Engineer
- BI Operations Engineer
- BI Application Manager

A BI administrator usually reports to a team lead of BI, a BI support track lead, or the Head of BI. The responsibilities of a BI administrator include:

- Installation and configuration of BI tech stack in all environments (multiple non-production environments such as development, integration, performance, **user acceptance testing** (**UAT**), and also production environments). Installation and configuration are usually not a daily activity but a less frequent activity. It is generally carried out once during the initial stage and thereafter on need basis (deployment in a new location, upgrade, tool migration, datacentre migration, server crash, etc.).
- Daily (regular) monitoring of the BI tech stack (all tools in all four layers - data acquisition, data storage, data processing, and information presentation) to ensure that the applications are up and running. Data loads in data lakes and data warehouse are monitored daily (nightly) to ensure that data is available as per expectations.
- User administration (for example, adding new users, providing right permissions based on roles such as developers, BI basic users, advanced users, maintaining user, group, profiles list, etc.) and supporting the users. Announcing and communicating downtimes and maintenance periods. Keeping users informed about any upcoming major changes that may have an impact.
- They are expected to carry out maintenance and updates on BI tech stack on need basis. It is their responsibility to maintain and enhance documentation about data, and keep the admin and support procedures up to date.

- Expected to coordinate with server administrators, network engineers, DBAs, and other support admins. Carrying out pre-deployment reviews, releases, hotfixes, troubleshooting, and incident and problem management.
- May have to support with ad hoc data enquiries directly from BI users and other stakeholders, especially when there are no BI analysts or data analysts to support such requests. Usually, only admins have direct access to production databases, that is, only read access permissions are provided to the OLTP DBs and read and write access to the databases of the BI solution.
- It is generally expected of a BI administrator to be up to date with new and emerging data technologies and provide support in evaluating new technologies, tools, processes, and practices. They are required to guide development teams, review deliverables, ensure that the deliverables from the development teams meet the technical standards and run in the production environment without crashing the production environment.
- It is expected of a BI administrator to identify and recommend process improvements, best practices, performance improvements, and suggest alternatives for continuous enhancement of the BI solution.
- When there are no BI vendor managers, a BI administrator is expected to coordinate with the BI vendors to ensure the licenses are properly managed.
- Based on the utilization ratio of servers and platforms such as ETL tool server, data warehouse, reporting and analytics platforms, etc., they should forecast the capacity and licenses required and plan accordingly.
- A BI administrator must understand end-to-end BI solution and be acquainted with the intra-dependencies within the BI solution and the interdependencies between the BI solution and source systems.

One of the challenging aspect of being a BI administrator to be emphasized is that BI administrators may have to make themselves always available, especially during nights to fix any issues that may occur in the nightly batch runs. Note: Although there are real-time data flows, even now most of the heavy ETL jobs run during the night, that is, the time period when the operational systems' utilization is at the lowest. Tip: If you are a person who cannot sleep after a short break in sleep in the night then I would recommend you not to consider this role.

## Business Intelligence Architect

Job titles equivalent to a BI architect include:

- Data Architect
- BI Solution Architect/Specialist

A BI architect usually reports to the Head of BI and works across multiple BI teams. The responsibilities of a BI architect are as follows:

- Assessing business and technical requirements, designing, validating, and maintaining business intelligence architectures (on-premises and in the cloud) and maximizing the potential of data assets efficiently. As a stakeholder of technical requirements, it is a BI architect's responsibility to ensure that BI teams are not only fulfilling functional requirements but also the non-functional requirements, especially those related to scalability, reusability, performance, maintainability, and data quality. They are also responsible for approving or rejecting design decisions made by other team members.
- Being acquainted with the latest BI tools and technologies available in the market. Proposing most suitable BI tools (frontend and backend) and technologies that aligns with the company's strategy. Suggest, recommend, or decide which tools to buy and which to build in-house.
- Collaborating with business analysts and other stakeholders, documenting and managing technical and architectural specifications, and advising on architectural issues. Recommending solutions to improve existing systems. A BI architect acts as liaison for all BI systems on technical topics with all stakeholders. They translate and articulate technical decisions into expected business outcomes and convey them to the management.
- Profile data from source systems, design solutions to integrate data from various source systems into data lakes, warehouses and marts and the presentation of this data to end users using data visualization software. For example, analyze and decide whether to have a direct connection to source systems or have a file-based transfer, in either case various stakeholders may have to be convinced by providing sound reasons for the option selected. Source team may not be happy with a direct connection, decision will have to be made case by case basis, at this point BI architect has to gather the support of management by providing the reasons.
- An architect may be expected to carry out the data modeling (design the data models), especially dimensional modeling when there is no dedicated data modeler. Expected to analyze the data entities and make decisions such as whether to use star schema or snowflake schema or hybrid schema (note: these topics are covered in *chapter 7 and 10*), which type of fact and dimension tables should be built, etc.
- Prepare documentation, including solution designs, data models, technical standards and guidelines. Support and guide the development team. Usually, a BI architect (full-time) is not expected to take part in the day to day development work. BI architect is expected to set the technical direction for the team.

- Design and share the best practices, carry out timely reviews and technical audits of all modules of BI and ensure modules are as per standards. A key member and usually the decision-maker in the BI governance function that sets the standards.
- Be up to date with the latest advancements in BI and data technologies. Attend BI conferences, share learnings with the team and increase the knowledge base.

A BI architect should have an overview of the BI technical landscape, thereby ensuring that there are no duplicate or redundant modules and incompatible modules built. By working across multiple teams, a BI architect should also pick up best practices from teams and pass it on to other teams and where authorized should get those best practices implemented. When this role is not rightly staffed, the BI architect can become a bottleneck, and teams may start doing their own thing when it comes to technical decisions. I have noticed in at least couple of projects that a BI architect is actually not leading the team on the technical front but is catching up (documenting what has already been developed) with the BI team, which obviously is not the intention of the role and doesn't serve the purpose. It is the BI architect's responsibility to ensure that the solutions built are not only satisfying current data sources and load volumes but also considers future loads and data sources that are to be integrated.

## Business Intelligence Developer

Job titles equivalent to a BI developer include:

- BI Engineer/Specialist
- BI Data Engineer/Developer
- Data Warehouse Developer/Engineer/Specialist
- Business Analytics Specialist/Developer/Engineer
- Data Specialist/Developer/Engineer
- Data Analytics or Data and Analytics Engineer/Developer
- Full Stack BI Developer/Engineer
- BI Backend/Frontend Developer/Engineer
- Software Developer/Engineer – BI focus
- Data Visualization Engineer or BI and Data Visualization Developer
- A specific focus such as an ETL, Data Integration, Reporting, or Analytics Developer/Engineer

- A specific BI tool such as a DataStage or MicroStrategy Developer/Engineer

Most of these roles are also currently promoted as big data developers, engineers, etc. Note that there can be a difference between the responsibilities depending on whether the BI developer is expected to work on part of the solution (for example frontend or backend) or whole (end-to-end or full stack). In large BI teams, we have ETL or data integration developers (backend developers), data modelers, and reporting and analytics platforms developers ( frontend developers). A developer is usually part of one agile BI development team reporting to a team lead of BI or the Head of BI. Responsibilities of a BI developer, considering they work on end-to-end solutions, include:

- Participating in the entire BI software development life cycle, including solution design, development, code review, testing, deployment (or handover to support teams for deployment) and bug fixes. The methodology of development varies from team to team and organization to organization. A developer follows whatever is the agreed methodology.
- Creating high-level design (when there are no BI architects), low-level design, data modelling (when there are no data modelers) and implementation of BI and data warehouse solutions based on requirement specifications, non-functional requirements, defined architecture (usually defined by BI architects) and applicable standards to provide business with reporting, dashboards, and self-service analytics platform.
- Developing ETL/ELT processes (jobs or data flows or packages or data pipelines for both streaming and batch data) using specific GUI-based platforms (ETL or data integration) tools such as Informatica, DataStage, BODS, etc., and/or code-based (programming languages) such as Python, Java, etc., and query languages such as SQL, PL/SQL, T-SQL, etc., to integrate new data sources into data repositories such as data lake (staging), data warehouse, data marts, data vaults, etc., in cloud and/or on-premises technologies or both based on technical specifications.
- Developing semantic layer (in simple terms a layer that bridges technical terms or metadata to business terms or metadata), dimensions/attributes, metrics/facts, reports, dashboards, data visualizations and advanced analytics solutions.
- Developing automated data quality checks to ensure high data quality of deliverables. This is applicable when there are no BI quality assurance engineers in the team.
- Taking ownership of technical process documentation.
- On the testing front, usually, developer's responsibility is limited to unit testing and peer code review. Integration testing, performance testing and

quality assurance may be handled by quality engineers or testers as seen in the next technical role.

In most projects, ETL developer (backend developer) may not have direct access to BI users and the other way around. So the BI user may not even be aware about ETL developers. BI users interact directly with either a BI business analyst or frontend (BI reporting and analytics platform) developer. But that doesn't mean that the ETL developers are in anyway less important than the client-facing roles.

ETL development is most often underestimated. Even with the availability of ETL tools such as Informatica, DataStage, etc., bulk of the effort involved in deriving information and insight from data lies in the ETL development, especially the "T" in ETL, transforming the data according to business rules. Complexity of business rules can range from very simple to very complex rules. For example, from *transform null to zero* to *calculate percentage increase in number of transactions based on the campaign or promotion*. Usually, quite a lot of data quality issues are noticed after ETL development has started, and then there is an unwritten expectation to fix all of the data quality issues in the ETL process itself, thereby increasing ETL development effort.

For a reporting and analytics platform developer, the challenge is to envision what a BI user may not have thought through while providing requirements. Most often, BI users may say what they really want only after they have seen or used the first version of the report or dashboard. The other challenge is to try and fit as many BI users' requirements as some of these can be subjective, for example, "I need only top 10" vs another user requesting "I need to be able to find top N (5, 10, 50, etc.)", "The chart should have only blue and red color" versus another user demanding usage of company's brand colors, and some users demanding finished reports and dashboards vs other users demanding a governed set of metrics and dimensions that they can use to build their own reports and dashboards or a combination of both.

It is also important to note that a BI developer is not the same as a software engineer or a software developer who develops a BI related software. A BI developer works on deriving information and insights from data whereas a software developer (BI tool developer) develops a tool or software that can be used by BI developers, users, etc. For example, a BI developer uses a tool such as MicroStrategy, Pentaho Data Integration, Python, or Java to work with or to process data whereas a BI tool developer could be a Java developer who creates the MicroStrategy or Pentaho Data Integration software itself. The key difference is the purpose, one is using a software to derive information and insights from data while the other is developing a software to deliver the software and is not interested in the data. BI developer is data-focused whereas a Java developer, in this case, is application-focused. Some organizations may build all or some of the BI software in-house instead of buying it. In the last two decades, only in one out of the several projects that I have worked, the organization wanted to build a reporting tool of its own, however for everything else such as ETL tools, they bought it. In such cases, a BI developer role includes developing the tool

first and then using the tool to work with data, in such cases this role can be easily split between different people.

## Business Intelligence Quality Assurance Engineer

Job titles equivalent to the BI quality assurance engineer are as follows:

- BI Tester
- Quality Engineer – BI focus or Quality Assurance Engineer – BI focus
- Data Warehouse Tester
- Data Test Engineer
- Software Tester – BI focus
- QA Tester or QA Automation Tester – BI focus
- A specific focus such as ETL, Reporting, or Analytics Tester
- A specific BI tool such as DataStage or MicroStrategy Tester

In many BI projects and teams, we may notice that there is no specific role of a BI tester or a quality assurance engineer as the developers test the deliverables among themselves in all of the non-production environments. The validation in production or live environment is done by the business analyst or directly by the users. The users of the BI solution are usually internal users (management) and therefore do not directly and immediately impact the end consumer of products and services of the business. On one side there may not be a tester at all in small teams and on the other side in big projects there can be a team dedicated for BI testing, especially in data or tool migration projects. A BI tester may be part of an agile development team reporting to a development team lead or may be part of a separate testing team reporting to a test lead. Responsibilities of a BI tester include:

- All of the general testing related activities such as creating test strategy, test plans, building and setting up of test data, testing, defect management, test automation, performance testing, integration testing, regression testing, maintaining test suite, scripts, etc., that are carried out by any other (non-BI) tester is applicable for a BI tester too. The activity to be highlighted specially for this role is related to data setup. While most of the other testers mainly focus on functionality and application testing, a BI tester focuses more on the data level testing, for example, is the right set of data picked up (included) or excluded in the ETL run, does the record get overwritten or does it make a new entry, and so on.
- Finding data issues and performance issues related to the data loads and report or dashboard refresh times, that is, along with functional requirements

ensure that the deliverables meet the non-functional requirements with respect to performance, efficiency and reusability.

- Ensuring that the base metrics and derived metrics are calculated as per specifications. Taking responsibility for analysis of the data quality in the BI solution.
- Writing simple to complex SQL queries to validate data along with other automated ways of testing.

# Techno-functional roles in BI

Team members in techno-functional roles act as a bridge between technical teams or technology and business users or management.

## Business Intelligence Analyst

Job titles similar to a BI analyst include:

- Data Analyst or Business Data Analyst
- Reporting and Analytics Specialist
- Data Scientist (not all of the profiles)
- Data Analytics Specialist
- Analytics and Insights Specialist
- Business Analytics Specialist or Data Analytics Specialist
- BI and Data Analytics Specialist
- BI Officer
- BI & Reporting Analyst / Officer
- Business Insights Analyst
- A specific domain or sector such as Retail or Healthcare BI Analyst
- A specific function such as People, Sales, or Partner Analytics Specialist
- BI Manager (This is different from a manager – Business Intelligence or other such managerial positions)
- Business Analytics Manager
- BI Solution Manager

Currently there are two different interpretations of BI analyst, and it is very much evident that there is a confusion. If you were to check what a BI analyst does in 10 different organizations or refer to the current BI job openings of BI analyst, you will notice that there are indeed two different interpretations, and both interpretations can be right. Let's call them Type 1 and Type 2 and describe them. In short, type 1 has end-to-end responsibility, that is, first to build the solution and then to analyze the data using the solution whereas type 2 deals mainly with the data analysis part, that is, they are not involved in building the BI solution. All responsibilities of type 2 are also part of type 1. In type 1, there is an expectation to also own or participate in the development of the BI application whereas in type 2, the expectations are limited to analysis using available BI and data capabilities and communication to stakeholders. The main responsibilities of a BI analyst are listed below for both types. In case a particular point is applicable only for one of the types it has been mentioned accordingly otherwise it means that the point is applicable for both. It is important to note that you may have come across a few BI analyst job openings that actually describe the role of a business analyst, that's a mistake, it should have been called **Business Intelligence Business Analyst** or **Business Analyst for Business Intelligence** (**BIBA**) and not BI analyst. Even though there are some overlapping responsibilities between BI analyst and BIBA, their core responsibilities are different. Hence, under BI analyst, the main responsibilities of BIBA are not covered. The difference between BI analyst and BIBA are covered after BIBA is explained in this chapter.

Responsibilities of a BI analyst include:

- Creating engaging visualizations, intuitive and scalable reports and dashboards that turn both quantitative and qualitative data into critical information and insights/knowledge that can be used by management to make sound business decisions.
- Defining metrics and KPIs, proactively tracking and maintaining metrics and KPIs to make sure that businesses measure what is relevant for business and proactively engaging stakeholders.
- Coming up with recommendations that directly address business objectives based on all types of analytics. Participating and supporting with insights in decision-making meetings.
- Cooperating with data engineers, data scientists, data analysts and other stakeholders across the organization to ensure that the right information is available and accessible.
- Assisting in the on-boarding, coaching and training of business unit end users in the use of BI tools.
- Gathering business data in many different ways, also looking at competitor

data and industry trends. With the data collected, help develop a picture of the company's competitiveness compared to other players in the market.

- Participating in the design, development, deployment and testing of BI/DW applications and solutions. [Type 1 only]
- Setting up of processes and framework to make the data solutions with a high availability and low maintenance cost. [Type 1 only]

In summary, whether it is Type 1 or Type 2, in my view this is one of the best roles when you want best of both worlds. This role is in touch with technology and at the same time close to the management, for example, discussing recommendations with the management and making a direct impact. The insights and inputs provided by a BI analyst can bring a big positive difference in the business, optimize and improve processes, save millions of dollars, etc. Usually BI analysts are expected to have very good domain/business/sector knowledge. A BI analyst may initially analyze data directly in the staging area or directly in data sources (OLTP) when the data is not available in data warehouses. BI analyst may also manually create reports for few iterations, and when the requirements are clear, passes it on to the development team.

## Business Intelligence Business Analyst

Job titles similar to a BI business analyst are as follows:

- MIS Business Analyst
- BI Product Owner or Business Analytics Product Owner
- Data Warehouse Business Analyst
- Business Analyst with BI/DWH focus
- Business Analyst Analytics or Business Analyst - Reporting and Analytics
- Business Analyst – Data Management
- Business Analyst – BI and Data Management
- Technical Business Analyst – Business Intelligence or Data Warehouse

*Product Owner* here refers to the agile team product owner and not the commercial product owner.

A BIBA's main focus is to enable others (business users, customers, etc.) to use BI solutions rather than themselves. BIBA is the bridge between the business users and BI development teams. BIBA is usually part of the BI team. Responsibilities of a BIBA include:

- Engaging with business stakeholders from all levels to gather, elicit, analyze requirements and document and maintain detailed requirements of new and additional BI solutions such as dashboards, reports, analytics solutions, etc.
- Translating business requirements to technical requirements, usually in the form of epics and user stories in an agile BI team.
- Performing detailed gap analysis, identifying data sources, creating solution concepts, mock-ups and working with stakeholders to develop the best possible solution.
- Acting as a technical product owner and envisaging requirements and concepts to inspire agile BI teams to deliver reusable deliverables. Building a delivery roadmap for the team.
- Coordinating between the BI team and business users, customers, other business analysts (source data teams) and production support teams.
- Prioritizing the requirements based on business and department strategy and building a product roadmap. Communicating plans for iterations to the stakeholders.
- Providing effort estimations, clarifying business questions from technical teams, validating deliverables (for example, reports, dashboards, data) before delivery, ensuring timely and high-quality delivery, conducting demos, onboarding new users and training users. Carrying out ad hoc data analysis based on business needs.
- Analyzing source systems, its processes, data flow and documenting it. Supporting data modeler and BI architect in developing the data model.
- Creating and maintaining user manuals and other documentations.

Similar to any other BA, in case of a BIBA too, one of the main challenges is to deal with the accusations from both sides. On one side customers/business users complain that a BA is not pushing the development team enough and on the other side development teams complain that a BA is pushing more than what the team can handle.

## BI Analyst vs BI Business Analyst

As quite a lot of people get confused between BI analyst and BIBA, the key differences between a BI analyst and BIBA are provided in *Table 5.1*.

| BI Analyst | BIBA |
|---|---|
| One of the main users of BI solutions. | Main focus is to enable others to use BI solutions. |
| Usually, part of the business departments such as marketing, sales, etc. | Usually part of the BI team. |
| Usually, a BI analyst is an individual contributor role. | Usually is part of the development team. |
| Carries out detailed and complex data analysis, including all variety of analytics. | Carries out simple to medium-level data analysis. Most of the time is spent in gathering requirements, translating it to technical requirements, enabling users to use BI solution, etc. |
| BI development team is not fully dependent on this role for getting the requirements. | BI development team is blocked if requirement specifications are not provided by BIBA. That is, BI development team depends fully on BIBA to provide the requirements. |
| Builds BI applications (Type 1 only) hands-on. | Does not build applications hands-on but writes specifications for the development team to build them. |

***Table 5.1**: Main differences between BI Analyst and BIBA*

Now the difference between a BI analyst and BIBA should be clear. Let's now take a look at the management roles in BI.

# Management roles in BI

As with any other field or department, in BI too, there are management and leadership roles starting from Team Lead and Head to C-Level, between Head and C-level there may be roles such as VP, SVP, etc., depending on the size and specific needs of an organization. The responsibilities of these roles in BI are comparable to similar roles at similar levels in other departments. The responsibilities related to general management, collaboration with senior management, leadership, etc., are common with other management roles and not covered in this chapter, only if there is something specific to BI, they are mentioned. Note that C-Level roles in BI are applicable only in those companies that have adopted CGCE or CGDE BI organizational models. To get an understanding of the management roles let's look

at the management roles in BI at Walget. The following *Figure 5.2* highlights the management roles in BI at Walget with one example function, Marketing.

| Title | Area of Responsiblity | An example |
|---|---|---|
| CDAO | Walget Corporate level | Corporate-wide all data |
| VP of BI | A global department across the group of Walget companies | Dealing with global marketing data |
| Head of BI | A department within a Walget company | Dealing with all marketing data of a Walget company |
| Team Lead of BI | A team within a department within a Walget company | Dealing with campaign data of a Walget company |

***Figure 5.2**: Management roles in BI at Walget*

As seen in the *Figure 5.2*, CDAO is responsible for the overall BI function of the entire Walget group. There is only one CDAO for the Walget group. VP of BI is responsible to fulfil all BI requirements of one global department that cuts across group of companies of Walget. There are multiple VP of BI positions, one each for every global department, one example that is provided in the *Figure 5.2* is of marketing department. Head of BI is responsible for fulfilling the BI requirements of one department within one company of Walget group. There are multiple Head of BI positions, one each for every department and similarly there are multiple BI team lead positions, one for every BI team. A BI team lead in this case, is responsible for fulfilling the BI requirements that are based on one of the subject areas (e.g. campaign management data) that is required for one of the departments (marketing in this case) within a company of Walget group.

As in the case of any of management jobs, the level (in the hierarchy) in which the manager operates determines the area and scope of responsibilities, for example, a team lead provides vision, roadmap, leadership, etc., at the team level whereas a Head provides these at a department level and so on. Same goes with budget responsibility, one is at a team level, another is at department level and the other is at corporate level. In the following paragraphs details related to 3 of the management roles in BI are provided:

## C-Level Role

Job titles in C-Level roles in BI include:

- **Chief Analytics Officer** (**CAO**)
- **Chief Data Officer** (**CDO**)
- **Chief Data and Analytics Officer** (**CDAO**)
- **Chief Business Intelligence Officer** (**CBIO**)

Data or analytics or BI specific C-Level roles such as Chief Analytics Officer or Chief Data Officer, Chief Data and Analytics Officer, Chief Business Intelligence Officer are not yet as common as other C-Level roles such as COO, CIO, CTO, etc. In many companies there are no C-Level-specific roles for BI, in such cases a VP or Head of BI reports directly to one of the existing C-Level roles such as a CIO, CMO, CFO, etc.

CAO seems to be the most popular title and CBIO seems to be the least popular based on the number of people currently in that role and based on the number of job openings. We can attribute this difference to the misconceptions about BI that we have dealt and clarified in the previous chapters. Some have wrongly assumed that BI is limited to reporting and visualization and therefore they would like to have a title that clearly indicates analytics, without recognizing the fact that BI in the broader sense includes analytics. In the future, when there is more clarity, we could see a rise in CBIO roles.

The BI specific responsibilities of all the BI management roles, at different levels with different scope are as follows:

- Overseeing the overall BI function within the organization (enterprise or department or team level).
- Driving the vision for reporting and analytics strategy and KPI framework.
- Hiring the right BI talent, procure the budget, align BI to organization's goals, drive BI roadmap, provide guidance and high-level technical direction, strategic technology planning, lead, define, grow, and manage BI team/s.
- Delivering enterprise reporting, analytics and self-service capabilities utilizing enterprise BI tools.
- Taking ownership and/or supporting in defining KPIs and metrics.
- Bringing own vision to the future of the BI team and acting as an internal spokesperson. Should be a data and BI champion.
- Translating business vision and priorities to BI requirements and priorities.

## Head of Business Intelligence

Job titles similar to a Head of BI include:

- Head of BI and Analytics
- Director of BI/Business Analytics/Analytics
- Data Engineering Director - Analytics

Some points to note are as follows:

- In some companies we may find VP of BI / Business Analytics / Analytics, especially when there are multiple subsidiaries, then a VP could be in charge of all BI talent in a subsidiary.
- In small companies, a Head of BI could be the final authority on BI topics and reporting directly to C-Level (CFO, CTO, etc.) and there may not be a CAO or CDAO. In large organizations, a Head of BI is in charge of multiple BI teams and leads a BI department.
- Rest of the points are same as the C-Level role, except for the fact the scope is at a different (lower than C-Level but higher than team lead) level.

## Business Intelligence Team Lead

Job titles similar to a BI team lead include:

- Business Analytics or Analytics Team Lead
- Data Warehouse and Reporting Team Lead
- Business Analyst with BI/DWH focus

Some points to note are as follows:

- Usually, a BI team lead leads one of the BI teams within one of the departments in an organization. The team size could vary. I have seen teams where there are only four team members and where there are 20+ team members.
- The team lead may lead either a team of BI frontend developers, or a team of BI backend developers, or an end-to-end BI development team that includes both BI frontend and backend developers, or only a team of support members (administrators or support engineers) or a team of BI quality engineers.
- A team lead could be partly hands-on in one of the technical roles or techno-functional roles while additionally managing the team.
- Rest of the points are same as the C-Level role, except for the fact that the scope is at a different (lower) level and a team lead may additionally provide technical BI leadership too.

# Exclusions

There are some roles or job titles that are intentionally excluded from the set of BI specific roles, those roles and reasons for the exclusions are discussed in the following sections.

## Data Steward

Data steward actually belongs to the data governance department. In some BI teams we may come across a data steward role, this is usually because the organization is lacking a data governance department, and as BI team works with data, with nowhere else to place, the data steward is placed in a BI team. This same reason is also true about why we find a data quality engineer in a BI team.

## Data Migration Engineer

Moving raw data from one system to another system for **non-BI** purposes sometimes may end up with a BI team. Note that it is not BI work. If a data migration engineer's job is only to build scripts/jobs to transfer data between two **Online Transaction Processing** (**OLTP**) systems then that is not a BI role. Just because a data migration engineer uses one of the tools (for example, an ETL tool) that the BI team uses, doesn't make that person a BI professional. Of course, at a later point in time, a data migration engineer can move to a BI team based on their data migration experience and become a BI developer. A BI role should play a part in deriving information and insight from data. Moving data from one place to another for operational purposes is not part of that process. Similar to how every person who uses a camera is not a professional photographer, every person who uses an ETL tool is not necessarily a BI professional.

## Project Manager

Responsibilities of a BI project manager are similar to any other IT solutions project manager. As there is not much that is BI specific or unique to be explained it has been excluded. Exclusion in no way suggests that project manager is not an important role. In fact, having a project manager who has good BI experience or is knowledgeable in BI can be a great advantage for the BI team and have better chances to successfully complete the project. In a project-based team structure, the team reports to the project manager and therefore a project manager has full control and authority to steer the team in the right direction to achieve the project goals. In a matrix organization, a project manager may not have enough authority to lead the BI team as per project needs.

## Suffixes and Prefixes

These are not roles on their own, these are suffixes and prefixes that indicates the seniority of a role. The suffixes and prefixes that are usually part of the job title, which may be misunderstood as a role, are excluded. For example, Senior, Junior, Lead, Principal, etc., are all intentionally excluded.

# Conclusion

In this chapter we have covered the most common and important roles in BI. As mentioned earlier, every role is important and adds value. It wouldn't be practical and wouldn't serve much use to cover each and every single BI job title (not role). The intention is to provide sufficient level of detail about the roles in BI so that learners are equipped, are able to understand and differentiate between roles that are required for their specific situations. Unfortunately, there is no standardization in job titles in BI, therefore you may notice that people with two different BI job titles performing the same role in different organizations and people with the same job titles performing different roles in different organizations. Hopefully, with this book and this chapter in particular, there is some reduction in the confusion about BI roles. This chapter also clarified why some of the roles such as a data migration engineer shouldn't be considered as a BI role.

If you have the task of building a BI team, you should now be in a better position to analyze the needs of your organization and also assess where your organization stands and which roles to hire. In the next chapter you will learn the financial aspects of BI such as how to calculate the cost of business intelligence and how to calculate the **return on investment** (**ROI**) of BI initiatives.

# Points to remember

Some key points to remember are as follows:

- BI roles discussed in this chapter are only those roles that are main roles in implementing and operating BI solutions and whose main job is to analyze data. General BI users are not included.
- Every BI role has its own set of challenges, no role is less or more challenging.
- BI organizational structures vary between businesses, even between those within the same type (sector or domain) of business.
- BI organizational models can be grouped into four models: NGDE, SGDE, CGCE, and CGDE.
- CGCE and CGDE are planned models whereas NGDE and SGDE are because of lack of planning and lack of centralized BI leadership.

- BI governance activities could be carried out by a dedicated team or a virtual team or a group.
- Under which department should BI be? or should BI be its own department at C-level? These topics are still not settled. All varieties can be seen.
- BI roles can be grouped into 3 categories: technical, techno-functional, and managerial.
- BI developer is not the same as the software developer/BI tool developer. BI developer works on deriving information and insights from data whereas a software developer (for example, a Java developer) develops a tool that can be used be used by BI developers, users, etc.
- Roles that are involved only in moving data between OLTP systems for non-BI purposes such as data migration engineers are actually not BI roles.
- BI analyst role is not the same as the BI business analyst. BI analyst's main focus is to use BI, to derive information and insight, whereas the main focus of BI business analyst is to gather business (BI users') requirements and translate that to technical requirements for the BI development team to build the BI solutions.
- There are multiple job titles for almost every role in BI.

# Multiple choice questions

1. **A typical BI team consists of**
   a) BI Developer
   b) BI Business Analyst
   c) BI Team Lead
   d) All of the above
2. **Which of these is not a BI specific role?**
   a) BI Analyst
   b) Data Analyst
   c) Data Migration Developer
   d) Chief Analytics Officer
3. **Which of these is not a BI specific role?**
   a) ETL Developer
   b) Data Quality Engineer

c) Microstrategy Developer

d) Business Analytics Engineer

4. **Which of these is not a type in BI organization model?**

a) NGDE

b) SGDE

c) CCGE

d) CGDE

5. **Which of these is an unplanned BI organization model?**

a) NGDE

b) SCDE

c) CGCE

d) CGDE

6. **BI governance function could be carried out by**

a) BICC

b) COE

c) Enterprise BI team

d) Any of the above

7. **BI teams may be within**

a) Marketing or Sales

b) Finance

c) IT

d) All of the above

8. **Which of these is not a category in the BI roles?**

a) Technical

b) Techno-functional

c) Process

d) Management

9. **In which of these models, the employees themselves try to establish some sort of BI governance without any dedicated team, without budget, etc.**
   a) NGDE
   b) SGDE
   c) CGCE
   d) CGDE
10. **Which of these is not a purely technical role?**
   a) BI Application Manager
   b) BI Manager
   c) BI Operations Engineer
   d) BI Quality Assurance Engineer
11. **Which of these activities is usually a responsibility of a BI architect?**
   a) Data Modeling
   b) Incident management
   c) Write test cases
   d) Gather business requirements
12. **Which of the below roles is not usually involved in BI user training?**
   a) BI Analyst
   b) ETL Developer
   c) BI Business Analyst
   d) BI Product Owner
13. **Which of these activities is most often underestimated?**
   a) ETL development
   b) Report development
   c) User training
   d) Testing

# Answers

1. **d**
2. **c**
3. **b**

4. **c**
5. **a**
6. **d**
7. **d**
8. **c**
9. **b**
10. **b**
11. **a**
12. **b**
13. **a**

# Questions

1. Why is data migration engineer not a BI role?
2. What are the differences between the four BI organizational models?
3. What are the differences between the responsibilities of a BI analyst and a BIBA?
4. Why is that that it is not mandatory for every BI team to have a BI tester or quality engineer?
5. In your view, which of the four BI organizational model is better and why?
6. What are some of the activities of governance function in BI?
7. In your view, which department should BI team belong to? And why?